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ABSTRACT

Presented in this teacher's guide for grades 7-12 are lesson plans and ideas for integrating industrial arts (drafting, woodworking, and metals) and environmental education. Each lesson originates with a fundamental concept pertaining to the environment and states, in addition, its discipline area, subject area, and problem orientation. Following this, behavioral objectives and suggested learning experiences are outlined. Behavioral objectives include cognitive and affective objectives and skills to be learned, while learning experiences list student-centered in-class activities and outside resource and community activities. Space is provided for teachers to note resource and reference materials--publications, audio-visual aids, and community resources. The guides are supplementary in nature and the lessons or episodes are designed to be placed in existing course content at appropriate times. This work was prepared under an ESEA Title III contract for Project I-C-E (Instruction-Curriculum-Environment). (BL)

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Project I - C - E

INSTRUCTION - CURRICULUM - ENVIRONMENT

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A SUPPLEMENTARY PROGRAM FOR ENVIRONMENTAL EDUCATION

DISCIPLINE AREA Industrial Arts GRADE 7-12

1. Drafting

2. Woodworking

3. Metals

Produced under Title III E.S.E.A.
PROJECT I-C-E
Serving Schools in CESA's 3-8-9
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Green Bay, Wisconsin 54301
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(after Dec. 1, 1972 - 468-7464)

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MATERIALS FOR ENVIRONMENTAL EDUCATION

Material Arts GRADE 7-12

Drafting

Woodworking

Tools

U.S.E.A.

Materials 3-8-9

54301

(468-7464)

Robert Warpinski, Director
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PREFACE

"Oikos" for house is the Greek origin of the term "ecology". studies our house--whatever or wherever it may be. Like an umbrella expand or contract to fit many ranges--natural and man-made. We environments, our many "houses" if we omit rancor and cite long complexities. Our "oikos" uses the insights of all subjects. T multidisciplinary program like ours necessarily results. Also, a long time, our program ranges K thru 12. The environment mirror values. These values have their origin in the "oikos" of our common minds. Let us become masters of our house by replacing the Greek with "Know thyself and thine house."

1. Written and designed by your fellow teachers, this guide is s to fit appropriately into existing, logical course content.
2. Each page or episode offers suggestions. Knowing your student to adapt or adopt. Limitless chances are here for your experience. Many episodes are self contained, some open-minded, still others developed over a few days.
3. Try these episodes, but please pre-plan. Why? Simply, no guide and no curriculum will work unless viewed in the context of your
4. React to this guide with scratch ideas and notes on the episodes.
5. After using an episode, fill out the attached evaluation form. Duplicate, or request more of these forms. Send them singly. We sincerely want your reactions or suggestions--negative and evaluations are the key in telling us "what works" and in aiding the guides.

TERMS AND ABBREVIATIONS

ICE RMC is Project ICE Resource Materials Center serving all public school districts in CESA 3, 8, and 9. Check the Project ICE Bibliography resources. Our address and phone number is on this guide's cover or call us for any materials or help.

BAVI is Bureau of Audio Visual Instruction, 1327 University Avenue, Madison, Wisconsin 53701 (Phone: 608-262-1644).

Cognitive means a measurable mental skill, ability, or process.
Affective refers to student attitudes, values, and feelings.

PREFACE

the Greek origin of the term "ecology". Environmental education wherever or wherever it may be. Like an umbrella, our house can fit many ranges--natural and man-made. We can add quality to our "houses" if we omit rancor and cite long range gains, costs, and "kus" uses the insights of all subjects. Thus, a rational, positive, program like ours necessarily results. Also, since attitudes grow over time ranges K thru 12. The environment mirrors our attitudes or have their origin in the "oikos" of our collective and individual masters of our house by replacing the Greek adage of "Know thyself" with "thine house."

and by your fellow teachers, this guide is supplementary in nature--it fits into existing, logical course content.

It offers suggestions. Knowing your students best, you decide what Limitless chances are here for your experimentation and usage. Self contained, some open-minded, still others can be changed or new days.

but please pre-plan. Why? Simply, no guide has all the answers, it will work unless viewed in the context of your students.

with scratch ideas and notes on the episode pages. Code, fill out the attached evaluation form in the back. Use, most more of these forms. Send them singly or collectively to us. Your reactions or suggestions--negative and positive. Your key in telling us "what works" and in aiding our revisions of

NS
ICE Resource Materials Center serving all public and non-public
SA 3, 8, and 9. Check the Project ICE Bibliography of available
s and phone number is on this guide's cover. Feel free to write
materials or help.

Audio Visual Instruction, 1327 University Avenue, P. C. Box 2093,
01 (Phone: 608-262-1644).

measurable mental skill, ability, or process based on factual data.
student attitudes, values, and feelings.

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Lord, Little Wolf
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Mary Wadzinski, How.-Suam.

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1. Energy from the sun, the basic source	Discipline Area	Industrial
of all energy, is converted through	Subject	Drafting
plant photosynthesis into a form	Problem Orientation	How
all living things can use for life	is related to the Diazo P	
processes.		

FSEA Title III - 59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES		SUGGESTED LEARNING EX
<p>Cognitive: The student will be able to produce a quality Diazo Print-- properly exposed.</p> <p>Affective: The student will understand the importance of original's overall quality and exposure time to print development.</p> <p>Skills to be Learned</p> <ol style="list-style-type: none"> 1. Line weight quality. 2. Operation of Diazo Machine. 3. Overall neatness 4. Selection of Diazo reproduction materials (if more than one are used) 	I. Student-Centered in class activity	II.
	<p>A. Demonstrate need for translucent original-- Run print using opaque and translucent original. Compare results.</p> <p>B. Show film.</p> <p>C. Make print with Sun Frame method.</p> <p>D. Make print with Diazo process.</p> <p>E. Have students compare and discuss process and results. Advantages and disadvantages</p> <p>F. Point out Diazo Process is controlled Sun energy.</p> <p>G. Develop bulletin board for trouble shooting Diazo prints (If this happened-you did this wrong)</p> <p>H. List other "Sun Energy" uses</p>	A

the basic source
 converted through Discipline Area Industrial Arts
 into a form Subject Drafting
 use for life Problem Orientation How Sun Energy Grade 7-12
 is related to the Diazo Process

SUGGESTED LEARNING EXPERIENCES

	I. Student-Centered in class activity	II. Outside Resource and Community Activities
ance	A. Demonstrate need for translucent original-- Run print using opaque and translucent original. Compare results.	A. Visit commercial blue print operation.
	B. Show film.	
	C. Make print with Sun Frame method.	
	D. Make print with Diazo process.	
	E. Have students compare and discuss process and results. Advantages and disadvantages	
ted)	F. Point out Diazo Process is controlled Sun energy.	
	G. Develop bulletin board for trouble shooting Diazo prints (If this happened-you did this wrong)	
	H. List other "Sun Energy" uses	

Resource and Reference Materials

Continued and Additional Suggested Materials

Publications:

Industrial Arts Drafting,
Walker-Ilevyak, Goodheart-
Willcox Co.
Drafting Technical Comm.,
Lawrence S. Wright,
McKnight & McKnight

Audio-Visual:

Walt Disney's "The Mystery
of The Cosmic Rays."

Community:

Materials Continued and Additional Suggested Learning Experiences

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C2 All living organisms interact

among themselves and their
environment, forming an intricate
unit called an ecosystem.

Discipline Area Industrial

Subject Drafting

Problem Orientation Clean

ESEA Title III
 Project I-C-E
 -59-70-0135-2

BEHAVIORAL OBJECTIVES

SUGGESTED LEARNING EXPERIENCES

Cognitive: The student will clean-up when the period arrives, and not only do his responsibility but also check overall results.

Affective: The student will understand all living systems interact among themselves and their environment, realizing clean-up is a combined effort, not an effort by an individual.

Skill to be Learned

- A. Cooperation
- B. Responsibility
- C. Benefits of clean-up.
 1. Neater drawings.
 2. Equipment in proper place.
 3. Better working atmosphere.
 4. Safer place to work.

I. Student-Centered in class activity.

A. Let clean-up go for one day.

B. Allow students to work 2nd day in messy area with dirty equipment.

C. Evaluate on 3rd day the need for clean-up and relate it to the shop production and environment.

D. Organize schedule of duties and responsibilities stressing teamwork.

E. Discuss and compare results of clean-up versus no clean-up, and discuss group interaction as it relates to clean-up.

II. Outcomes

A.

B.

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Discipline Area Industrial Arts

Subject Drafting

Problem Orientation Clean-Up Grade 7-12

FIVES

SUGGESTED LEARNING EXPERIENCES

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I. Student-Centered in class activity.

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- D. Organize schedule of duties and responsibilities stressing teamwork.
- E. Discuss and compare results of clean-up versus no clean-up, and discuss group interaction as it relates to clean-up.

II. Outside Resource and Community Activities

- A. Field trip to local manufacturing area to view practical applications and advantages of neatness and cleanliness.
- B. Presentation by industrial commission representative on safety and production as related to neatness and teamwork.

Resource and Reference Materials <u>Publications:</u>	Continued and Additional Suggested Learning Activities
<p data-bbox="373 1110 611 1145"><u>Audio-Visual:</u></p> <p data-bbox="373 1336 763 1436">Community: Safety Inspector Industrial Commission</p>	<p data-bbox="1058 901 1315 936">(Con't from E)</p> <ol data-bbox="1058 955 1791 1087" style="list-style-type: none"> 1. Develop methods of making clean-up re more efficient. 2. Develop list on where c se a team cle would be beneficial.

Continued and Additional Suggested Learning Experiences

(Don't from E)

Develop methods of making clean-up responsibility more efficient.

Develop list on where else a team clean-up effort would be beneficial.

ESEA Title III - 59-70-0135-2 Project I-C-E

C O N C E P T	3. <u>Environmental factors are limiting</u>	
	<u>on the numbers of organisms living</u>	Discipline Area
	<u>within their influence, thus, each</u>	Subject
	<u>environment has a carrying capacity.</u>	Problem Orientation

BEHAVIORAL OBJECTIVES	SUGGESTED L
<p><u>Cognitive:</u> Students will be able to select and or design joint (s) that best suits the job. (Appearance, strength, ease of making, etc.)</p> <p><u>Affective:</u> The student will understand how grain, materials, fasteners, fit affect joint quality.</p>	<p>I. Student-Centered in class activity</p> <p>A. Have students design simple joints for strength and or appearance.</p> <p>B. Develop test for joint around available equipment, test for:</p> <ol style="list-style-type: none"> 1. Strength <ol style="list-style-type: none"> A. Shear B. Stress C. Compression D. Tensile 2. Appearance (Pure value judge) 3. Ease of making & cation <p>C. Incorporate joints in project drawing.</p> <p>D. Bean bag discussion "Draw parallels between joint breakdown and ecosystem breakdown. (i.e. Poorly constructed neglected joint breaks under stress, as ecosystem does when congested, and neglected.</p>
<p><u>Skills to be Learned</u></p> <p><u>Joint use and design</u></p> <ol style="list-style-type: none"> 1. Material strength 2. Joint use <ol style="list-style-type: none"> A. Inside-Outside B. Structural Appearance 3. Ease of construction. 	

l factors are limiting

f organisms living Discipline Area Industrial Arts

fluence, thus, each Subject Drafting

a carrying capacity. Problem Orientation Joint Design & Carrying Capacity Grade 7-12

CTIVES

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

- A. Have students design simple joints for strength and or appearance.
- B. Develop test for joints around available equipment, test for:
 1. Strength
 - A. Shear
 - B. Stress
 - C. Compression
 - D. Tensile
 2. Appearance (Pure value judgement)
 3. Ease of making & application
- C. Incorporate joints in project drawing.
- D. Bean bag discussion
"Draw parallels between joint breakdown and ecosystem breakdown.
(i.e. Poorly constructed or neglected joint breaks down under stress, as ecosystem does when congested, abused or neglected.

II. Outside Resource and Community Activities

- A. Field trip to local manufacturing plant. Talk with product engineer.
- B. Forest products lab. evaluate students joint designs.

Resource and Reference Materials	Continued and Additional Suggested
<p><u>Publications:</u> <u>Drafting Technical Communication</u> Lawrence S. Wright McKnight & McKnight, Bloomington, Ill., 1968 <u>Mechanical Drawing</u> French & Svensen McGraw Hill, 1966</p> <p>Audio-Visual: Starley Tools Film Strips Charts Movies Bavi #2666 Design for ARC Welded Structures Bavi #1217 Using Nails and Screws <u>Community:</u> Forest Products Laboratory</p>	<p>Continued evaluation of joint se Develop a collection of joints. Conduct a contest for joint stre quality wanted.</p>

Reference Materials	Continued and Additional Suggested Learning Experiences
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Communication t, 1968	Continued evaluation of joint selection. Develop a collection of joints. Conduct a contest for joint strength or whatever quality wanted.
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For ARC Welded
ails and Screws
poratory

C 4. An adequate supply of pure
 O
 N water is essential for life.
 C
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 P
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Discipline Area Industrial
 Subject Drafting
 Problem Orientation Waste Wa

ESEA Title III - 59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES
 Cognitive: The student will be able to list the types of paper used in drafting. The student will be able to name the paper companies having waste water treatment. Facilities within a 20 mile radius of the school.
 Affective: The student will appreciate the effect of clean water on recreation, fishing, ect.

Skills to be Learned
 1. Paper composition
 2. How paper is made
 3. The treatment of water after it is used in a paper mill.

SUGGESTED LEARNING EXPERIENCES
 I. Student-Centered in class activity
 A. Students will study types of paper used in drafting.
 1. Rag
 2. Sulphite
 B. In connection with paper making, student will study water treatment facilities in paper companies.
 1. Machine used in treatment.
 2. Chemicals used in treatment.
 3. Short and long term plans for water treatment facilities.
 C. Develop bulletin board flow charts showing waste water treatment process.

II. Out
 A. Field
 B. Public
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supply of pure

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Discipline Area Industrial Arts

Subject Drafting

Problem Orientation Waste Water Grade 7-12

OBJECTIVES

SUGGESTED LEARNING EXPERIENCES

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- I. Student-Centered in class activity
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1. Pag
 2. Sulphite
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1. Machine used in treatment.
 2. Chemicals used in treatment.
 3. Short and long term plans for water treatment facilities.
- C. Develop bulletin board flow charts showing waste water treatment process.

- II. Outside Resource and Community Activities
- A. Field trip to a paper mill.
- B. Public relations dept. of a local paper mill.

water
r a

Resource and Reference Materials	Continued and Additional Suggested Learning
<p data-bbox="369 869 616 901"><u>Publications:</u></p> <p data-bbox="396 901 510 934"><u>Books:</u></p> <p data-bbox="396 934 898 1259"> <u>Pulp and Paper,</u> <u>500 Howard St.</u> <u>San Francisco, Calif. 94105</u> <u>American Paper Industry</u> <u>2570 Devon Avenue</u> <u>DesPlaines, Ill. 60018</u> <u>Chem Paper Processing</u> <u>Hale Publishing Company</u> <u>One Park Street</u> <u>Stanford, Conn. 06901</u> </p> <p data-bbox="369 1282 613 1315"><u>Audio-Visual:</u></p> <p data-bbox="396 1315 833 1515"> <u>Recycling Paper</u> <u>Riverside Paper Company</u> <u>Appleton, Wisconsin</u> <u>Great White Trackaway</u> <u>Hammermill Paper Company</u> <u>Erie, Pennsylvania</u> </p> <p data-bbox="369 1538 555 1571"><u>Community:</u></p> <p data-bbox="396 1571 852 1645"> <u>Public Relations Dept. of</u> <u>an area paper mill.</u> </p>	

ear s Continued and Additional Suggested Learning Experiences

C 5. An adequate supply of clean air
 O
 N is essential because most organisms Discipline Area
 C
 E depend on oxygen, through respiration, Subject
 P
 T to release the energy in their food. Problem Orientat

ESEA Title III -59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING ACTIVITIES
Cognitive: The student will be able to plan and design a sub-division including adequate vegetation areas.	I. Student-Centered in class activity
Affective: The student will list two or three ways in which vegetation areas promote air quality	A. Teacher will explain and lead discussion on photosynthesis.
Skill to be Learned	B. Determine (as a result of discussion) why trees, shrubs, and other greenery are important to clean air.
A. Plot planning	C. Have students roughly design sub-division by using plot plans.
B. Space conservation	D. Evaluate sub-divisions of
C. Organic architecture	1. Green Areas
	2. % of house to lot
	3. Privacy area
	4. Practicality

the supply of clean air

because most organisms Discipline Area Industrial Arts

through respiration, Subject Drafting - Arch.

energy in their food. Problem Orientation Green Areas Grade 11-12

OBJECTIVES	SUGGESTED LEARNING EXPERIENCES	
Student will design including areas.	I. Student-Centered in class activity	II. Outside Resource and Community Activities
Student will ways in areas pro-	A. Teacher will explain and lead discussion on photo-synthesis.	A. Presentation by sub-division planner who utilizes vegetation areas.
	B. Determine (as a result of discussion) why trees, shrubs, and other greenery are important to clean air.	E. Field trip or area study of local sub-divisions to see if studied concepts are actually applied.
	C. Have students roughly design sub-division by using plot plans.	
	D. Evaluate sub-divisions on:	
	1. Green Areas	
	2. % of house to lot	
	3. Privacy area	
	4. Practicality	

Resource and Reference Materials	Continued and Additional Suggested
<u>Publications:</u> <u>Architecture Drafting and Design</u> , Herler & Wallach McGraw Hill, 1965 <u>Soil Surveys and Land Use Planning</u> , Soil Science Society of America & American Society of Agronomy, 1966	1. Have students continue search "Ideal" sub-division in area usage for air quality.
<u>Audio-Visual:</u> Baird #6730 <u>New Guidelines for the Well Landscaped Home</u> .	
<u>Community:</u> 1. Sub-Division Planner	

ials Continued and Additional Suggested Learning Experiences

1. Have students continue searching for "Ideal" sub-division in areas of vegetation usage for air quality.

C 6. Natural resources are not equally
 O distributed over the earth or over Discipline Area Industrial
 N time and greatly affect the geo- Subject Drafting
 C graphic conditions and quality of Problem Orientation Project
 E life.

ESEA Title III -59-7000135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
<p>Cognitive: Each student will be able to efficiently plan projects to use as little natural resources as possible.</p> <p>Affective: The student will be given guide lines for a specific project and he will choose materials which reflect low waste.</p>	<p>I. Student-Centered in class activity</p> <p>A Design projects that will be of a nature that will help students plan projects to put natural resources to their greatest use-- As little waste as possible</p> <p>Example: Design bird houses from a 4 x 8 plywood sheet. A. Bird house requirement 1. Floor size 2. Hole size 3. Hole above floor 4. Bird</p> <p>Design house cutting diagram.</p>
<p><u>Skills to be Learned</u></p> <p>A. Maximum material useage</p> <p>B. Production planning</p> <p>C. Production efficiency</p>	

resources are not equally
 ria er the earth or over Discipline Area Industrial Arts
 ng y affect the geo- Subject Drafting
 oje ons and quality of Problem Orientation Project Planning Grade 7-12

EX	OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
I. ent will ly plan little possible nt will for a ne will h reflect	I. Student-Centered in class activity A Design projects that will be of a nature that will help students plan projects to put natural resources to their greatest use-- As little waste as possible Example: Design bird houses from a 4 x 8 plywood sheet. A. Bird house requirement 1. Floor size 2. Hole size 3. Hole above floor 4. Bird Design house cutting diagram.	II. Outside Resource and Community Activities A.DNR . Representative B. Forest Products Lab.
usage ing iency		

Resource and Reference Materials	Continued and Additional Suggested Learning
<p data-bbox="371 948 609 983"><u>Publications:</u></p> <p data-bbox="371 983 947 1110">DNR. Publications Drawing for Product Planning, George E. Stephenson Chas. A. Bennette Co., Inc. 1970</p> <p data-bbox="371 1238 609 1273"><u>Audio-Visual:</u></p> <p data-bbox="371 1505 872 1598"><u>Community:</u> Design engineers from local manufacturer.</p>	<ol style="list-style-type: none"> <li data-bbox="1059 948 1791 983">1. On every project reflect material use <li data-bbox="1059 983 1791 1052">2. Develop a collection of projects which excellent material usage.

Materials	Continued and Additional Suggested Learning Experiences
nin use hic g, 1970	<ol style="list-style-type: none"> 1. On every project reflect material useage. 2. Develop a collection of projects which reflect excellent material usage.

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7. Factors such as facilitating

transportation, economic conditions,

population growth, and increased

leisure time have a great influence
on changes in land use and centers
of population density.

Discipline Area In

Subject Dr

Problem Orientation

BEHAVICRAL OBJECTIVES

SUGGESTED LEARN

Cognitive: The student
will know how lack of plann-
ing years ago is now pro-
ducing land use problems in
his local community.
Affective: The student
will list the steps to
be taken for better
community land use.

Skills to be Learned

How to help in community
planning for maximum land
usage.

Basic map making & reading
of topographical maps.

Use of cameras & tape
recorders.

I. Student-Centered in class
activity

- A. Students working in group
will produce a slide pre-
sentation of good and poor
land use in the community
- B. Discussion on steps to be
taken for better local
land use.

ESEA Title III -59-70-0135-2 Project I-C-E

ers such as facilitating
ation, economic conditions, Discipline Area Industrial Arts
Dr n growth, and increased Subject Drafting
ion time have a great influence Problem Orientation Community Planning Grade 11-12
s in land use and centers
tion desity.

AL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES	
<p>he student lack of plann- is now pro- se problems in community. he student steps to better d use.</p> <p>learned n community maximum land</p> <p>ing & reading cal maps. & tape</p>	<p>I. Student-Centered in class activity</p> <p>A. Students working in groups will produce a slide presentation of good and poor land use in the community.</p> <p>B. Discussion on steps to be taken for better local land use.</p>	<p>II. Outside Resource and Community Activities</p> <p>A. Community Planners make a presentation of future plans for the community.</p> <p>B. Field trip around the community with students taking pictures and recording comments on tape for future presentations.</p>

Resource and Reference Materials	Continued and Additional Suggested Learning Activities
<p><u>Publications:</u> <u>HUD Literature</u> <u>Architecture Drafting and Design</u>, Hepler & Wallach <u>McGraw Hill</u>, 1965 <u>Soil Surveys and Land Use Planning</u>, Soil Science Society of America & American Society of Agronomy, 1966</p> <p><u>Audio-Visual:</u> <u>Student and teachers</u> <u>developed slides.</u></p> <p><u>Community:</u> <u>City Plan Commission</u></p>	<p>Develop picture collection of good and poor land use.</p> <p>Conduct a Contest</p> <ol style="list-style-type: none"> 1. Select a real piece of property within the community which presents a problem ie, gravel pit, swamp. Have students develop a long term solutions which reflect best possible use for the community.

Materials	Continued and Additional Suggested Learning Experiences
<p>ing and allach</p> <p>and Use</p> <p>ence & f Agronomy,</p> <p>rs</p> <p>on</p>	<p>Develop picture collection of good and poor land use.</p> <p>Conduct a Contest</p> <ol style="list-style-type: none"> 1. Select a real piece of property within the the community which presents a future problem ie, gravel pit, swamp. Have students develop a long term solutions which will reflect best possible use for the community.

C 8. Cultural, economic, social, and
 O political factors determine status
 N of man's values and attitudes
 C toward his environment.
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 and re-engin

ESLA Title III - 59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING
<p>Cognitive: Students will be able to identify objects that are both functional & economic</p> <p>Affective: Students will observe and learn to save materials otherwise used to an excess</p>	<p>I. Student-Centered in class activity</p> <p>A. General concept. Include in the design the idea of the importance of using materials within limits. Usually there is too much material used for a given piece of construction.</p> <p>B. Students in engineering drafting can divide up the parts to save on excess materials.</p> <p>C. Redesign parts to use standard materials to cut down machine time and/or save assembly operations.</p>
<p>Skills to be Learned</p> <p>A. Material useage</p> <p>B. Redesign</p> <p>C. Function</p>	

economic, social, and

discussors determine status

crafts and attitudes

environment.

engineering

Discipline Area Industrial Arts

Subject: Drafting

Problem Orientation Material useage Grade 9-12
and re-engineering

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OBJECTIVES

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

- A. General concept. Include in the design the idea of the importance of using materials within limits. Usually there is too much material used for a given piece of construction.
- B. Students in engineering drafting can divide up the parts to save on excess materials.
- C. Redesign parts to use standard materials to cut down machine time and/or save assembly operations.

II. Outside Resource and Community Activities

- A. Product engineer local manufacturer
- B. Forest Products Lab. (Wood Area)

Resource and Reference Materials	Continued and Additional Suggested Learning Resources
<p data-bbox="472 924 719 959"><u>Publications:</u></p> <p data-bbox="472 959 1049 1122"><u>Drawing for Product Planning</u>, George E. Stephenson Chas. A. Bennett Co., Inc. 1970 <u>Mechanical Drawing</u>, French & Svensen, Mcraw Hill, 1966</p> <p data-bbox="472 1187 872 1320"><u>Audio-Visual:</u> (Metals) BAV I #2666 <u>Design for RC Welded</u> <u>Structures</u></p> <p data-bbox="472 1419 744 1482"><u>Community:</u> Local Engineer</p>	

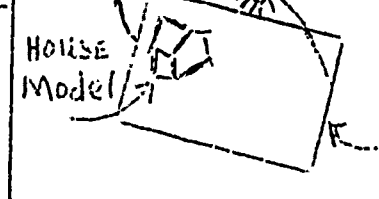
Learning Experiences	Continued and Additional Suggested Learning Experiences
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9. Man has the ability to manage,
manipulate, and change his
environment.

Discipline Area Industrial
Subject Drafting
Problem Orientation Sun Energy
Orientation

ESEA Title III - 59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
<p><u>Cognitive:</u> The student will locate a model home to take fullest advantage of the sun.</p> <p><u>Affective:</u> The student will explain the advantages and values of proper house orientation with the sun.</p>	<p>I. Student-Centered in class activity Note - Model arrangement is used which included room modules to create given house design and home placement in relation to sun. "SUN" Support Rod</p>
<p><u>Skills to be Learned</u></p> <p>A. Placement of a house to use sun energy for heat and light.</p> <p>B. Saving of lighting costs.</p> <p>C. Saving of heating costs.</p> <p>D. Reading plot plans, maps, & azimuth charts.</p>	<p>II. On</p> <p>Co</p> <p>Lo</p> <p>HOUSE Model</p>  <p>A. Have class discuss and try various arrangements for desired sun utilization.</p> <p>B. Explain zoning limitations.</p> <p>C. Present and explain azimuth-longitude charts.</p>

manage,

Discipline Area Industrial Arts

Subject Drafting - Arch.

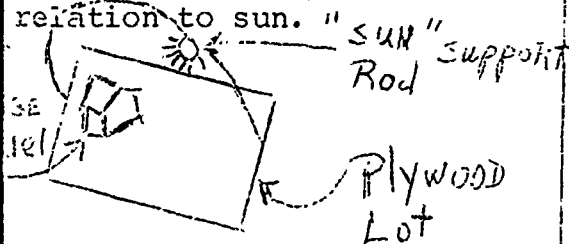
Problem Orientation Sun Energy & Orientation Grade 11-12

SUGGESTED LEARNING EXPERIENCES

Student-Centered in class activity

Note - Model arrangement

is used which included room modules to create given house design and home placement in relation to sun. "SUN" support



II. Outside Resource and Community Activities
Local Architect

- A. Have class discuss and try various arrangements for desired sun utilization.
- B. Explain zoning limitations.
- C. Present and explain azimuth-longitude charts.

Resource and Reference Materials	Continued and Additional Suggested Learning Activities
<p data-bbox="424 892 662 920"><u>Publications:</u></p> <p data-bbox="424 920 982 1017"><u>Architecture Drafting & Design</u> Hepler & Wallach, McGraw Hill, 1965</p> <p data-bbox="424 1117 773 1180"><u>Audio-Visual:</u> Teacher made model.</p> <p data-bbox="424 1408 712 1471"><u>Community:</u> Local Architect.</p>	<p data-bbox="1111 892 1816 990">Have students study their own and neighborhood determine in how many cases the home is situated better.</p>

Materials	Continued and Additional Suggested Learning Experiences
Have students study their own and neighbors' homes to determine in how many cases the home could have been situated better.	

C O N C E P T	10. <u>Short-term economic gains</u>	_____	_____
	<u>may produce long-term environmental</u>	Discipline Area	Indu
	<u>losses.</u>	Subject	Draf
	_____	Problem Orientation	P

BEHAVIORAL OBJECTIVES		SUGGESTED LEARNING
ESEA Title III -59-70-0135-2 Project I-C-E	<u>Cognitive:</u> The student will be able to make a working drawing of a project that fulfills a given set of needs. <u>Affective:</u> The student will be able to analyze a problem.	I. Student-Centered in class activity A. Show film strip design in wood 2nd half. B. Have class select project to be designed. C. From class discussion develop list of "needs" 1. Where will it be used. 2. How will it be used. 3. What will it hold. 4. What materials. 5. What machines and/or tools available. 6. How much will it cost. D. Depending on group's ability have groups or individuals solve problem. E. Have class discuss and evaluate results.
	<u>Skills to be Learned</u> A. Project planning 1. Problem analysis 2. Problem solving 3. Working drawing 4. Production B. Waste makes waste both time and material	

gains

Industrial Discipline Area Industrial Arts

Drafting Subject Drafting

Problem Orientation Project Planning Grade 7-12

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

- A. Show film strip design in wood 2nd half.
- B. Have class select project to be designed.
- C. From class discussion develop list of "needs".
 - 1. Where will it be used.
 - 2. How will it be used.
 - 3. What will it hold.
 - 4. What materials.
 - 5. What machines and/or tools available.
 - 6. How much will it cost.
- D. Depending on groups ability have groups or individuals solve problem.
- E. Have class discuss and evaluate results.

II. Outside Resource and Community Activities

- A. Local product engineer
- B. Have students evaluate mass produced items as they differ from individualized items.

ed I nued and Additional Suggested Learning Experiences

C 11. Individual acts, duplicated
 O
 N or compounded, produce significant
 C
 E environmental alterations over time.
 P
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Discipline Area Industrial

Subject Drafting

Problem Orientation Saving
and

ESEA Title III - 59-70-0135-2 Project I-C-E	BEHAVIORIAL OBJECTIVES	SUGGESTED LEARNING
	<p><u>Cognitive:</u> The student will understand the amount of time and materials necessary to produce a set of house plans.</p> <p><u>Affective:</u> The student will make use of intermediates to save time and materials.</p>	<p>I. Student-Centered in class activity</p> <p>A. From a set of house plans, discover how many times the same basic drawing is used.</p> <ol style="list-style-type: none"> 1. Floor plan 2. Electric plan 3. Heating plan 4. Plumbing plan 5. Joist layout 6. Sub-floor layout 7. Stud layout <p>B. Discussion on quickest way to produce necessary prints.</p> <p>C. Demonstrate: Intermediates</p> <ol style="list-style-type: none"> 1. Sepia 2. Eraseable sepia 3. Intensifier film 4. Eraseable intensifier film <p>D. Through math calculation find the amount of paper and time saved through the use of an intermediate</p>
	<p><u>Skills to be Learned</u></p> <p><u>Use of intermediate.</u></p>	

Discipline Area Industrial Arts
 Subject Drafting - Arch.
 Problem Orientation Saving of paper Grade 11-12
and time.

SUGGESTED LEARNING EXPERIENCES

I. Entered in class set of house plans, how many times basic drawing is plan istic plan ng plan ing plan layout floor layout layout on on quickest roduce necessary ate: iates able sepia ifier film ole intensifier ath calculation amount of paper saved through f an intermediate	II. Outside Resource and Community Activities
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rest Continued and Additional Suggested Learning Experiences

C 12. Private ownership must be
 O
 N regarded as a stewardship and should
 C
 E not encroach upon or violate the
 P
 T individual right of others.

Discipline Area
 Subject
 Problem Orientation

ESEA Title III -59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES

Cognitive: The student will be able to design a residential dwelling that conforms to local zoning laws.
 Affective: The student will realize the importance of zoning laws.

Skills to be Learned
 Zoning laws protect the rights of others

SUGGESTED LEARNING

- I. Student-Centered in class activity
 - A. Presentation and class discussion by a representative of the local zoning committee
 - B. Have students identify zoning laws which will affect their problem
 - C. Students will realize from class discussion and debate how zoning laws protect the rights of others
 - D. Evaluate finished plans in relationship to zoning laws. (local building inspector)

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cs.
Discipline Area Industrial Arts
Subject Drafting - Arch.
Problem Orientation Zoning laws Grade 11-12

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

- A. Presentation and class discussion by a representative of the local zoning committee
- E. Have students identify zoning laws which will affect their problem
- C. Students will realize from class discussion and debate how zoning laws protect the rights of others
- D. Evaluate finished plans in relationship to zoning laws. (local building inspector)

II. Outside Resource and Community Activities

- A. Zoning Committee Rep.
- B. Local Building Inspector

Resource and Reference Materials Continued and Additional

Publications:

General Architectural Drawing,
William E. Wyatt, Chas. Bennett Co.
1969.

Architecture Drafting and
Design, Hepler & McGraw Hill
1965

Soil Surveys and Land Use
Planning, Soil Science
Society of America & American
Society of Agronomy, 1966

Audio-Visual:

Community:

Zoning Commission Representative
Local Building Inspector

Continued and Additional Suggested Learning Experiences

ESEA Title III -59-70-0135-2 Project I-C-F

C 1. Energy from the sun, the basic
 O source of all energy, is converted Discipline Area Industri
 N through plant photosynthesis into Subject Woods
 C a form all living things can use for Problem Orientation How
 P life processes.

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
<p>Cognitive: The student will produce a list of 5 conditions which will result in optimum tree growth.</p> <p>Affective: The student will be able to recognize factors which positively and/or negatively affect tree growth and quality.</p> <p>Skills to be Learned</p> <ol style="list-style-type: none"> 1. Selective cutting 2. Maximum growth 3. Annual Rings pattern (how related to grain pattern) 4. Proper methods of tree placement in planting for greatest growth. 	<p>I. Student-Centered in class activity</p> <ol style="list-style-type: none"> A. Slide presentation showing trees grown in different situations B. Discussion on presentation <ol style="list-style-type: none"> 1. Which trees showed greatest growth-why. 2. Why didn't other trees show same progress? <ol style="list-style-type: none"> a. Density of growth area. b. Tree management, etc. C. Offer actual samples for comparison <ol style="list-style-type: none"> 1. Densely planted vs. sparsely planted area (shade effects) 2. Growth of pruned tree vs. neglected tree. D. Present: (Outside resource) Strength of lumber in relation to growth conditions. E. Open discussion- tree growth as observed by students. <p>II.</p>

asic

Discipline Area Industrial Arts

Subject Woods

Problem Orientation How a tree grows Grade 7-12

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

- A. Slide presentation showing trees grown in different situations
- Discussion on presentation
 1. Which trees showed greatest growth-why.
 2. Why didn't other trees show same progress?
 - a. Density of growth area.
 - b. Tree management, etc.
- Offer actual samples for comparison
 1. Densely planted vs. sparsely planted area (shade effects)
 2. Growth of pruned tree vs. neglected tree.
- Present: (Outside resource) Strength of lumber in relation to growth conditions.
- Open discussion- tree growth as observed by students.

II. Outside Resource and Community Activities

1. Forester
2. Lumber dealer or representative

Resource and Reference Materials	Continued and Additional
<u>Publications:</u> <u>Life of The Forest</u> , Jack McCormick McGraw-Hill <u>Woodworking for Industry</u> , John L. Feirer, Chas. A. Bennett Co.	F. Have student growth cond G. Suggest and conditions.
<u>Audio-Visual:</u> 1. Teacher made slide series 2. Sample collection 3. <u>Paper Makes Wis. Great</u> , Project I-C-E, Filmstrip, Teachers guide	
<u>Community:</u> Forester Lumber Dealer	

Additional Materials	Continued and Additional Suggested Learning Experiences
<p>Identify conditions and problems.</p> <p>Jack McCormick Industry, John L. Bennett Co.</p>	<p>F. Have students inspect own area for tree growth conditions.</p> <p>G. Suggest and carry out methods of improving local conditions.</p>
<p>the series</p> <p>Great, filmstrip,</p>	

C 2. All living organisms interact
 O among themselves and their environ- Discipline Area Indust
 C ment, forming an intricate unit called Subject Woods
 E an ecosystem. Problem Orientation Cle

BEHAVIORAL OBJECTIVES

SUGGESTED LEARNING

Cognitive: The student will clean-up when the clean-up period arrives, and not only completed his responsibility but also check cverall results against class developed standard..

Affective: The student will understand all living systems interact among themselves and their environment, realizing clean-up is a combined effort, not an effort by an individual.

Skills to be Learned

1. Co-operation
2. Responsibility
3. Benifits of clean-up
 - A. Neater work
 - B. Equipment in proper place.
 - C. Better working atmosphere
 - D. Safer place to work

- I. Student-Centered in class activity
 - A. Let clean-up go for one day
 - B. Allow students to work 2nd day in messy area
 - C. Evaluate on 3rd day the need for clean-up and relate it to the shop production and environ-ment.
 - D. Organize schedule of duties and responsibilities stressing teamwork.
 - E. Discuss and compare results of clean-up vs. no clean-up and discuss group inter-action as it relates to clean-up.

ESEA Title III -59-70-0135-2 Project I-C-E

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ods Subject Woods
Cle Problem Orientation Clean-Up Grade 7-12

ING SUGGESTED LEARNING EXPERIENCES

II. Entered in class

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udents to work
an messy area
on 3rd day the
clean-up and
t to the shop
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schedule of
nd responsibilities
g teamwork.
and compare
of clean-up vs.
n-up and discuss
ter-action as it
to clean-up.

II. Outside Resource and
Community Activities

1. Field trip to local
manufacturing area
to view practical
applications and
advantages of neat-
ness and cleanliness
2. Presentation by
industrial commission
representative on
sa.ety and production
as related to neat-
ness and teamwork

Resource and Reference Materials	Continued and Additional Suggest
<p><u>Publications:</u> <u>Woodworking for Industry</u> John L. Feirer Chas. A. Bennett Co. <u>Modern Carpentry</u>, Willis H. Wagner, Goodheart-Wilcox <u>General Shop Woodworking</u>, Fryklund & LaEerge McKnight & McKnight.</p> <p><u>Audio-Visual:</u> <u>Industrial Arts: A Safe Shop</u> University of Ill.</p>	<ol style="list-style-type: none"> 1. Develop methods of making cl more efficient. 2. Develop list on where else a would be beneficial.
<p><u>Community:</u> Safety Inspector Industrial Commission</p>	

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se a
ued and Additional Suggested Learning Experiences
velop methods of making clean-up responsibility
re efficient.
velop list on where else a team clean-up effort
uld be beneficial.

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3. Environmental factors are limiting

on the numbers of organisms living

within their influence, thus, each

environment has a carrying capacity.

Discipline Area

Industrial

Subject

Woods

Problem Orientation

Crowding
Shop

BEHAVIORAL OBJECTIVES

Cognitive: The student will list and explain three physical and three psychological effects of environmental crowding and relate them to specific shop areas.
Affective: The student will realize that crowding results in adverse physical and psychological conditions.

Skills to be Learned
Hazards in environmental crowding.

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

A. Conduct experiment around following conditions:

1. Develop simple task ie, saw off lumber layout and drill 4 holes.

2. Provide only one each of tools required

3. Limit work area to one table.

4. Limit time.

5. Mass production not allowed.

6. First three done win.

B. Discuss personal & physical feelings experienced during experiment.

1. Low production

2. Confusion

3. Frustration

4. Irritability

5. Waste

6. Injury

C. What happens if this happened in town?

ESEA Title III -59-700135-2 Project I-C-E

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each Subject Woods
ydir city. Problem Orientation Crowding in the Grade 7-12
Shop

SUGGESTED LEARNING EXPERIENCES

SUGGESTED LEARNING EXPERIENCES	
Out Co 1. 2. 3.	Student-Centered in class Activity Conduct experiment around following con- ditions: 1. Develop simple task ie, saw off lumber layout and drill 4 holes. 2. Provide only one each of tools required 3. Limit work area to one table. 4. Limit time. 5. Mass production not allowed. 6. First three done win. Discuss personal & physical feelings experienced during experiment. 1. Low production 2. Confusion 3. Frustration 4. Irritability 5. Waste 6. Injury What happens if this happ- ened in town?
	II. Outside Resource and Community Activities 1. Psychologist 2. Community Planning Committee. 3. Real Estate Developer

Resource and Reference Materials Publications:	Continued and Additional Suggested
<p>Audio-Visual: #53525 <u>Man's Effect on The Environment, University of Ill. Champaign, Ill.</u></p> <p>Community: 1. Psychologist or Sociologist 2. Community Planning Committee 3. Real Estate Developer</p>	<p>D. Relate results experienced during concept #3.</p>

ted and Additional Suggested Learning Experiences
urise late results experienced during experiment to
cept #3.

C 4. An adequate supply of pure water

O is essential for life.

Discipline Area Indus

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ESEA Title III -59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING
<p><u>Cognitive:</u> The student will be able to list five advantages of planting and cutting to control water run off.</p> <p><u>Affective:</u> The student will understand how to control water run off.</p> <p><u>Skills to be Learned</u></p> <ol style="list-style-type: none">1. Selective cutting can control water run off.2. Reforestation practices3. Run-off control minimizes stream pollution	<p>I. Student-Centered in class activity</p> <ol style="list-style-type: none">1. Class discussion centered around film strips and/or locally produced slides, showing difference of water run off on properly cut and planted versus improperly cut and planted.2. Discussion by local forester about how selective cutting can control run off and improve tree stand (possible field trip)3. Follow-up. Run tests of lakes and streams with and without protection of trees and evaluate results. Question: Would reforestation minimize problem?

Discipline Area Industrial Arts
Subject Woodworking
Problem Orientation Control of Water Grade 7-12
Run-Off

SUGGESTED LEARNING EXPERIENCES

I. Inside Resource and
Classroom-Centered in class
Activity
Class discussion centered
around film strips and/or
locally produced slides,
showing difference of water
run off on properly cut
and planted versus improp-
erly cut and planted.
Discussion by local forest-
ranger about how selective cut-
ting can control run off
and improve tree stand
(possible field trip)
Follow-up.
In tests of lakes and
streams with and without
protection of trees and
evaluate results.
Question: Would reforest-
ation minimize problem?

- II. Outside Resource and
Community Activities
1. Planting trees
 2. Helping in selective
cutting
 3. Long term--check on
water quality as
checked by planting
 4. Long term--photo-
graph
 5. Student developed
slide series of
local conditions
 6. Field trip with local
forester

Resource and Reference Materials
Publications:

Continued and additional Suggested Learning

1. Revegetate a stream (under direction of State Dept.) to control water run-off.
2. Clean out a local stream.

Audio-Visual:

Teacher/student developed
slide series
#01893 Forest Products
University of Ill, Champaign, Ill

Community:

1. DNR
2. ASCS

near
stic

d and additional Suggested Learning Experiences
getate a stream (under direction of Conservation
t.) to control water run-off.
n out a local stream.

ESEA Title III -59-70-0135-2 Project I-C-E

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5. An adequate supply of clean
air is essential because most
organisms depend on oxygen, through
respiration, to release the energy
in their food.

Discipline Area Indus
Subject Woodw
Problem Orientation R
Clean Ai

BEHAVIORAL OBJECTIVES

Cognitive: The student
will be able to list
five health hazards due
to air pollution in a
woodworking shop.
Affective: The student
will take preventive
measures to stop air
pollution when working
with wood.

Skills to be learned
Ways to reduce air pollution
in a shop environment.

SUGGESTED LEARNING

- I. Student-Centered in class activity
- A. Dust collection system will not be used for a one day period to show students how dust will collect on projects, clothes, tools and machines.
 - B. During next working period dust collector will be used and students will observe difference in working conditions.
 - C. Student-small group, busy session.

of clean
 dust be most Discipline Area Industrial Arts
 odw gen, through Subject Woodworking
 n R the energy Problem Orientation Relationship of Grade 7-12
 Air Clean Air to Health

SUGGESTED LEARNING EXPERIENCES

- | | |
|--|--|
| <p>I. Student-Centered in class activity</p> <p>A. Dust collection system will not be used for a one day period to show students how dust will collect on projects, clothes, tools and machines.</p> <p>B. During next working period dust collector will be used and students will observe difference in working conditions.</p> <p>C. Student-small group, busy session.</p> | <p>II. Outside Resource and Community Activities</p> <p>Inspector from State Dept. of Labor, Management and Human Relations.</p> |
|--|--|

Resource and Reference Materials	Continued and Additional s
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Publications:

Audio-Visual:

Community:
Local Representative of Dept. of
Labor, Management and Human
Relations.

al s ls Continued and Additional Suggested Learning Experiences

of

C 6. Natural resources are not equally
O distributed over the earth or over Discipline Area Industri
N time and greatly affect the geo- Subject Woods
C graphic conditions and quality of Problem Orientation Lumbe
P life. ty

ESEA Title III -59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING E
<p><u>Cognitive:</u> Student will research, create, and compare itemized cost sheets of lumber 20 years ago, 10 years ago, and the present time. Students will then present their findings to the class via oral report and visual aid.</p> <p><u>Affective:</u> Student will be able to see monetary effect of diminishing resources and resource location in the lumbering industry.</p>	<p>I. Student-Centered in class activity</p> <p>A. Discuss cost sheets</p> <ol style="list-style-type: none"> 1. What is included 2. Format <p>B. Have students compile cost sheets of 20,10, and 1 year ago for a standard article in local area</p> <p>C. Discuss local area cost sheets, comparing cost fluctuations and probable causes over the years.</p> <ol style="list-style-type: none"> 1. Availability 2. Forest management 3. Demand 4. Additional expenses <p>D. Compare and discuss: Local area cost sheets versus cost sheets from other geographical area. (teacher furnished) Discuss reasons for variations.</p> <ol style="list-style-type: none"> 1. Location 2. Transportation <p>(Con't)</p>
<p><u>Skills to be Learned</u></p> <ol style="list-style-type: none"> 1. Cost analysis 2. Timber forest and lumbering locations 3. Graphic illustrations 4. Cause-effect thinking 	<p>II.</p>

equally

str over Discipline Area Industrial Arts
s geo- Subject Woods
mbe ty of Problem Orientation Lumber Cost Increases Grade 7-12

G E SUGGESTED LEARNING EXPERIENCES

II. Student-Centered in class activity

1. Discuss cost sheets
 1. What is included
 2. Format
3. Have students compile cost sheets of 20, 10, and 1 year ago for a standard article in local area
2. Discuss local area cost sheets, comparing cost fluctuations and probable causes over the years.
 1. Availability
 2. Forest management
 3. Demand
 4. Additional expenses
0. Compare and discuss: Local area cost sheets versus cost sheets from other geographical area. (teacher furnished)
Discuss reasons for variations.
 1. Location
 2. Transportation(Con't)

II. Outside Resource and Community Activities

1. D.N.R. Representative
2. Forest manager
3. Local lumber dealer
4. Contractor

Resource and Reference Materials	Continued and Additional Suggest	ia
<u>Publications:</u> Catalogs from lumber dealers. <u>Woodworking for Industry,</u> John L. Feirer, Chas. A Bennett Co <u>General Shop Woodworking, FryKlund</u> & La Berge, McKnight & McKnight	(Con't from D) 3. Forest management 4. Demand	et yK gh
<u>Audio-Visual:</u>		
<u>Community:</u> Local lumber dealers		

Materials	Continued and Additional Suggested Learning Experiences (Con't from D)
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. ett Co yKluna ght	3. Forest management 4. Demand
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N
C
E
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7. Factors such as facilitating transportation, economic conditions population growth, and increased leisure time have a great influence on changes in land use and centers of population density.

Discipline Area Industrial Subject Woodwork Problem Orientation Leisure

BEHAVIORAL OBJECTIVES		SUGGESTED LEARNING	
ESPA Title III -59-70-0135-2 Project I-C-E	Cognitive: The student will be able to list 10 new businesses and industries created by the do-it-yourself concept.	I. Student-Centered in class activity	II.
	Affective: The student will make better use of his leisure time through the use of do-it-yourself woodworking projects. <u>Skills to be Learned</u> Efficient use of leisure time. Research.	A. Students will research how the do-it-yourself leisure activities have changed industries, transportation, and population centers, by means of: 1. Personal interview-local industrialist, businessmen, etc. 2. Magazine/newspaper reading. 3. Books. 4. A-V materials. 5. Letters of inquiry to various companies. 6. Small-group brainstorming.	

Discipline Area Industrial Arts
Subject Woodworking
Problem Orientation Leisure Time Grade 9-12

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class
Activity
Students will research
how the do-it-yourself
leisure activities have
changed industries,
transportation, and pop-
ulation centers, by
means of:
Personal interview-
local industrialist,
businessmen, etc.
Magazine/newspaper read-
ing.
Books.
A-V materials.
Letters of inquiry to
various companies.
Small-group brain-
storming.

II. Outside Resource and
Community Activities
Local building supply
dealers.
Operators of craft and
hobby shops.

Resource and Reference Materials	Continued and Additional Suggestions
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Publications:

Do-It-Yourself Encyclopedia

Project plan books

Magazines, Better Homes & Gardens, etc.

Audio-Visual:

Community:

Local building supply dealer.

Local hobby & craft shop
personal.

ued and Additional Suggested Learning Experiences

C	<u>8. Cultural, economic, social, and</u>		
O	<u>political factors determine status</u>	Discipline Area	<u>Industrial</u>
N	<u>of man's values and attitudes</u>	Subject	<u>Woods</u>
C	<u>toward his environment.</u>	Problem Orientation	<u>Econom</u>
E			<u>material</u>
P			
T			

ESEA Title III -59--70-0135-2 Project I-C-F	BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXP	
		I. Student-Centered in class activity	II. O
	Cognitive: The student will resaw lumber for his project whenever possible.	A. Class discussion of how can the material we use in the shop be used most economically in the follow-	Co
	Affective: The student will realize that resawing lumber for panels saves not only materials but also money thus minimizing waste.	ing areas:	A.
		1. Project design (Standard Material)	B.
		2. Material Layout (Minimize waste)	
		3. Reworked material (Resawing)	
		B. Bandsaw demonstration	
		1. Resawing	
		A. Blade width	
		B. Fence	
		C. Feather board	
		2. Handling resawed mat'rl	
		A. Gluing & clamping	
		B. Surfacing	
		3. Design alternatives with resawed mat'rl	
	Skills to be Learned		
	1. Use of the bandsaw for resawing		
	2. Project planning for resawing.		

1, and

ial	status	Discipline Area	Industrial Arts
s	Subject	Woods	
nom	Problem Orientation	Economic use of	Grade 8-12
eri		material	

EXP	SUGGESTED LEARNING EXPERIENCES	
. O	Student-Centered in class activity	II. Outside Resource and Community Activities
Co		
A.	A. Class discussion of how can the material we use in the shop be used most economically in the following areas:	A. Local shop owners talk about reusable material in their business.
B.	1. Project design (Standard Material)	B. Chamber of Commerce list of areas businesses Student evaluate which produce the "most use-less" wastes.
	2. Material Layout (Minimize waste)	
	3. Reworked material (Resawing)	
	B. Bandsaw demonstration	
	1. Resawing	
	A. Blade width	
	B. Fence	
	C. Feather board	
	2. Handling resawed mat'rl	
	A. Gluing & clamping	
	B. Surfacing	
	3. Design alternatives with resawed mat'rl	

Resource and Reference Materials	Continued and Additional Suggested Learning Materials
<p data-bbox="472 857 719 886"><u>Publications:</u></p> <p data-bbox="472 886 942 925"><u>Woodworking for Industry,</u> John L. Feirer Chas. A. Bennett Co.</p> <p data-bbox="472 925 885 963"><u>Exploring Woodworking,</u> Fred W. Zimmerman Goodheart-Willcox</p> <p data-bbox="472 1152 719 1181"><u>Audio-Visual:</u></p> <p data-bbox="472 1181 1094 1220">BAVI #2640 Danish Design</p> <p data-bbox="472 1220 1094 1258">#03230 <u>Man and The Forest, Part 1</u></p> <p data-bbox="472 1258 1094 1297">#03370 <u>Man and the Forest, Part 2</u> University of Ill.</p>	

and Additional Suggested Learning Experiences

C
O
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9. Man has the ability to manage,
manipulate, and change his
environment.

Discipline Area In
 Subject Wo
 Problem Orientation

ESEA Title III -59-70-0135-2 Project I=C-E	BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING
	<p>Cognitive: The student will be able to graph how a tree will produce immensely more under growing conditions manipulated by man.</p> <p>Affective: The student will be able to plant, and care for trees in a manner which will produce maximum growth.</p>	<p>I. Student-Centered in class activity</p> <p>A. Presentation by the D.N.I. on how man is manipulating the environment in which a tree grows to produce maximum yield.</p>
	<p><u>Skills to be Learned</u></p> <p>How to produce trees that will yield maximum material in the shortest growing time possible.</p>	

Discipline Area Industrial Arts
Subject Woodworking
Problem Orientation Super Trees Grade 9-12

SUGGESTED LEARNING EXPERIENCES

nt-Centered in class
ity
resentation by the D.N.R.
how man is manipulating
the environment in which
tree grows to prod
maximum yield.

- II. Outside Resource and
Community Activities
- A. Field trip to an
area such as the:
1. Seed Orchard
 2. Nicolet National
Forest, East of
Langlade, Wis.
Highway 64.
 3. Tree farms operated
by paper mills
and lumber companies
- B. D.N.R.

Resource and Reference Materials	Continued and Additional Suggest
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Publications:

Exploring Woodworking,
Fred W. Zimmerman
Goodheart-Willcox
General Shop Woodworking,
Fryklund & LaBerge
McKnight & McKnight
Woodworking for Industry,
John L. Feirer
Chas. A. Bennett Co.

Audio-Visual:

52386 Conservation in Our
Forest
#01889 Forest Conservation,
University of Ill. Champaign, Ill.

Community:

D.N.R.

Additional Suggested Learning Experiences

CONCEPT 10. Short-term economic gains may produce long-term environmental losses.

Discipline Area Indus
Subject Woods
Problem Orientation

ESEA Title III - 59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES

Cognitive: The student will list 10 conditions which effect the quality of a saw log.
Affective: The student will become aware of the adverse effects of cutting for pure profit.

Skills to be learned
Forest management
A. Selective cutting
B. Proper pruning or trimming
C. Use of a crushing stick

SUGGESTED LEARNING

- I. Student-Centered in class activity
 - A. Develop a collection of boards which contain defects which effect the grade of the board
 1. Natural defects
 - a. Knots
 - b. Wanes
 - c. Shakes
 - d. Natural holes
 - e. Staining
 2. Man made defects
 - a. Splits
 - b. Cracking
 - c. Checking
 - d. Honeycombing
 - e. Caseharding
 - f. Man made holes
 - g. Staining
 - B. Discuss what happened to cause the various defects.
 - C. Were these defects a result of "Rushing?" (Con't)

ns may

ntal

Discipline Area Industrial Arts

Subject

Woods

Problem Orientation Production of Grade 7-12
quality saw logs

SUGGESTED LEARNING EXPERIENCES

Student-Centered in class
activity

II. Outside Resource and
Community Activities

A. Develop a collection
of boards which contain
defects which effect
the grade of the board

1. Natural defects

- a. Knots
- b. Wanes
- c. Shakes
- d. Natural holes
- e. Staining

2. Man made defects

- a. Split
- b. Cracking
- c. Checking
- d. Honeycombing
- e. Caseharding
- f. Man made holes
- g. Staining

B. Discuss what happened to
cause the various defects.

C. Were these defects a result
of "Rushing?" (Con't)

Resource and Reference Materials	Continued and Additional Suggest
<p data-bbox="594 866 841 895"><u>Publications:</u></p> <p data-bbox="594 895 1062 929"><u>Woodworking for Industry,</u></p> <p data-bbox="594 929 860 959">John L. Feirer</p> <p data-bbox="594 959 967 993">Chas. A. Bennett Co.</p> <p data-bbox="594 993 1012 1027"><u>Exploring Woodworking,</u></p> <p data-bbox="594 1027 917 1056">Fred W. Zimmerman</p> <p data-bbox="594 1056 917 1090">Goodheart-Willcox</p> <p data-bbox="594 1090 1062 1124"><u>Cabinetmaking & Millwork,</u></p> <p data-bbox="594 1124 860 1154">John L. Feirer</p> <p data-bbox="594 1154 967 1188">Chas. A. Bennett Co.</p> <p data-bbox="594 1226 841 1256"><u>Audio-Visual:</u></p> <p data-bbox="594 1256 990 1290">#81995 <u>Working Forest</u></p> <p data-bbox="594 1290 929 1319">University of Ill.</p> <p data-bbox="594 1319 1024 1353">Teacher developed slide</p> <p data-bbox="594 1424 776 1453"><u>Community:</u></p> <p data-bbox="594 1453 852 1483">Local forester</p>	<p data-bbox="1279 866 1546 895">(Con't from I.)</p> <p data-bbox="1279 895 1812 929">D. How can growing quality be</p> <p data-bbox="1279 929 1812 959">E. Presentation by local fore</p> <p data-bbox="1279 959 1812 1038">F. Develop slide series of w the "quick buck" VS. cut</p>

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y be
for
f w
ut

Continued and Additional Suggested Learning Experiences
(t from I.)

How can growing quality be controlled?
Presentation by local forest ranger.
Develop slide series of wood lots--cut for
the "quick buck" VS. cut for management.

C .1. Individual acts, duplicated
O
K or compounded, produce significant Discipline Area Industrial
C
E environmental alterations over Subject Woods
P
T time. Problem Orientation Material Waste

FSEA Title III -59-70-0135-2 Project I-C-D	BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXP	
		I. Student-Centered in class activity	II. O
	Cognitive: The student will select material and work with it in a manner that results in minimum or zero waste.	A. Class discussion of working allowance (Poem)	C
	Affective: The student will realize that efficient use and careful workmanship reduces waste and results in savings.	"Half an inch longer 'tis we saw Quarter of an inch wider is the law An eighth on thickness is enough Where sawing lumber from the rough."	A
	Skills to be Learned	B. Students will lay-out assigned projects on paper representing 4x8 plywood calculate % of waste	D
	1. Efficient use of materials	C. Discuss waste multiplier for both boards versus plywood-- % of rejects	
	2. Working allowance	D. Students will go to local lumber yard and obtain price lists to realize the amount of money spent for waste.	
	A. Hand tools		
	B. Machine		
	3. Multiplied waste		
	4. Multiplied carelessness. (scrap/rejects)		

Discipline Area Industrial Arts

Subject Woods

Problem Orientation Material Use Vs. Grade 7-12
Waste

SUGGESTED LEARNING EXPERIENCES

<p>-Centered in class</p> <p>discussion of</p> <p>ing allowance</p> <p>(Poem)</p> <p>an inch longer 'tis</p> <p>aw</p> <p>er of an inch wider</p> <p>the law</p> <p>ighth on thickness</p> <p>enough</p> <p>sawing lumber</p> <p>the rough."</p> <p>ents will lay-out</p> <p>igned projects on</p> <p>c representing</p> <p>plywood calculate</p> <p>waste</p> <p>ass waste multiplier</p> <p>both boards versus</p> <p>ood---% of rejects</p> <p>ents will go to local</p> <p>er yard and obtain</p> <p>e lists to realize</p> <p>amount of money</p> <p>t for waste.</p>	<p>II. Outside Resource and Community Activities</p> <p>A. Quality c ntrol engineer</p> <p>B. D.N.R.--wood use</p>
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Resource and Reference Materials	Continued and Additional Suggestions
<p data-bbox="557 864 795 897"><u>Publications:</u></p> <p data-bbox="557 897 1024 929"><u>Woodworking for Industry,</u></p> <p data-bbox="557 929 820 962">John L. Feirer</p> <p data-bbox="557 962 925 994">Chas. A. Bennett Co.</p> <p data-bbox="557 994 1058 1027"><u>Cabinetmaking and Millwork,</u></p> <p data-bbox="557 1027 820 1059">John L. Feirer</p> <p data-bbox="557 1059 925 1092">Chas. A. Bennett Co.</p> <p data-bbox="557 1092 963 1124"><u>Exploring Woodworking,</u></p> <p data-bbox="557 1124 877 1157">Fred W. Zimmerman</p> <p data-bbox="557 1157 877 1189">Goodheart-Willcox</p> <p data-bbox="557 1227 795 1259"><u>Audio-Visual:</u></p> <p data-bbox="557 1259 986 1292">#50750 <u>American Sawmill</u></p> <p data-bbox="557 1292 1024 1324">#03230 <u>Man and The Forest</u></p> <p data-bbox="557 1324 1039 1357">Part 1, University of Ill.</p> <p data-bbox="557 1459 744 1492"><u>Community:</u></p> <p data-bbox="557 1492 1005 1524">Quality control engineer</p> <p data-bbox="557 1524 668 1557">D.H.R.</p>	<p data-bbox="1243 864 1820 957">1. Students will redesign projects using new materials thereby, freeing up materials for other uses.</p>

Materials	Continued and Additional Suggested Learning Experiences
<p>est obj g</p>	<p>1. Students will redesign projects to use less materials thereby, freeing materials for other uses.</p>

C	12. Private ownership must be regarded	
O	as a stewardship and should not	Discipline Area In
N		
C	encroach upon or violate the	Subject Wo
E		
P	individual right of others,	Problem Orientation
T		

E	BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING
ESEA Title III -59-70-0135-2 Project 1-C	<p><u>Cognitive:</u> The student will develop and defend a code or law for a given tract of land which reflects "proper" land use.</p> <p><u>Affective:</u> The student will know how building codes and zoning laws affect and dictate land use.</p>	<p>I. Student-Centered in class activity</p> <p>A. Discuss how building codes & zoning laws dictate land use</p> <ol style="list-style-type: none"> Land Use (type of area) <ol style="list-style-type: none"> Commercial Residential Recreational Building placement Building spacing <p>B. Discuss reasons behind building code regulations</p> <ol style="list-style-type: none"> How do they benefit people? <ol style="list-style-type: none"> Planners Builders Residents How do they hinder people? <ol style="list-style-type: none"> Planners Builders Residents <p>C. Discuss correlation between good building codes and zoning laws and good residential environmental and ecological conditions.</p>
	<p><u>Skills to be Learned</u></p> <ol style="list-style-type: none"> Zoning laws. Building Codes. Proper Land Use. 	

regarded

In Discipline Area Industrial Arts
Wo Subject Woods - Building Trades
tion Problem Orientation Building Codes & Grade 9-12
Zoning Laws

SUGGESTED LEARNING EXPERIENCES	
ment-Centered in class	II. Outside Resource and Community Activities
ivity	A. Local Govt. official to explain reasoning behind codes & zoning
Discuss how building codes & zoning laws dictate land use	B. Zoning commissioner, town or village official
1. Land Use (type of area)	C. Local building inspector
a. Commercial	D. Architect
b. Residential	E. Local contractor
c. Recreational	F. Safety & sanitation inspector
2. Building placement	G. N.D.R. Representatives and films concerning "before & after development"
3. Building spacing	
Discuss reasons behind building code regulations.	
1. How do they benefit people?	
a. Planners	
b. Builders	
c. Residents	
2. How do they hinder people?	
a. Planners	
b. Builders	
c. Residents	
Discuss correlation between good building codes and zoning laws and good resulting environmental and ecological conditions.	

Resource and Reference Materials	Continued and Additional Suggest
<u>Publications:</u> <u>Modern Carpentry,</u> <u>Willis H. Wagner</u> <u>Goodheart-Willcox</u> <u>Architecture Drafting and Design</u> <u>Hepler & Wallach, McGraw Hill</u>	Develop easy reference chart codes and zoning laws.
<u>Audio-Visual:</u> <u>Illinois Cities: How They Grow</u> <u>University of Ill.</u>	
<u>Community:</u> All sources listed under "Outside Resources and Community Activities" on reverse side.	

Suggested Materials	Continued and Additional Suggested Learning Experiences
rt'	Develop easy reference chart for basic building codes and zoning laws.

nd Design
Hill

row

community
side.

C 1. Energy from the sun, the
O basic source of all energy, is Discipline Area In
N converted through plant photosyn- Subject He
C thesis into a form all living things Problem Orientation
E can use for life processes.

LSEA Title III -59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING
<p><u>Cognitive:</u> The student will be able to explain, in writing, how oxygen is used in the welding and cutting process.</p> <p><u>Affective:</u> The student will understand the use of oxygen in the welding and cutting process.</p>	<p>I. Student-Centered in class activity</p> <p>A. Class discussion on how oxygen is produced in nature through photosynthesis and commercially through electrolysis.</p> <p>B. Experiment showing how a candle will burn in the presence of oxygen and go out as oxygen is used.</p> <p>C. Relate experiment to flame cutting process.</p> <p>D. Develop relation of electrolysis to sun energy</p>
<p><u>Skills to be Learned</u></p> <p>How oxygen is produced.</p> <p>How oxygen is used in the welding process.</p>	

from the sun, the

In of all energy, is

Discipline Area Industrial Arts

through plant photosyn-

Subject Metals

on a form all living things Problem Orientation Oxygen Production Grade 9-12
life processes.

OBJECTIVES	SUGGESTED LEARNING EXPERIENCES	
Student explain, oxygen welding ss. Student he use welding ss.	<p>I. Student-Centered in class activity</p> <p>A. Class discussion on how oxygen is produced in nature through photosynthesis and commercially through electrolysis.</p> <p>B. Experiment showing how a candle will burn in the presence of oxygen and go out as oxygen is used.</p> <p>C. Relate experiment to flame cutting process.</p> <p>D. Develop relation of electrolysis to sun energy</p>	<p>II. Outside Resource and Community Activities</p> <p>Local welding supply house.</p>
d. ned duced. d in the		

Resource and Reference Materials	Continued and Additional Suggested Learning Activities
<p data-bbox="415 894 656 917"><u>Publications:</u></p> <p data-bbox="415 917 961 987">Available from welding supply houses for the asking:</p> <p data-bbox="415 987 885 1080"><u>Oxyacetylene Welding and Cutting</u>, Stuart Plumley McGraw Hill</p> <p data-bbox="415 1173 656 1196"><u>Audio-Visual:</u></p> <p data-bbox="415 1196 637 1243">Flame charts</p> <p data-bbox="415 1429 599 1452"><u>Compatibility:</u></p> <p data-bbox="415 1452 961 1522">Rep. from local welding supply house.</p>	

Materials	Continued and Additional Suggested Learning Experiences
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C 2. All living organisms interact
 O
 H among themselves and their
 C
 E environment, forming an intricate
 P
 T unit called an ecosystem.

Discipline Area Industrial

Subject Metals

Problem Orientation Clear

ESEA Title III -59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
<p><u>Cognitive:</u> The student will clean-up when the clean-up period arrives, and not only do his responsibility but also check overall results.</p> <p><u>Affective:</u> The student will understand all living systems interact among themselves & their environment realizing clean-up is a combined effort not an effort by an individual.</p>	<p>I. Student-Centered in class activity</p> <ol style="list-style-type: none"> 1. Let clean-up go for one day. 2. Allow students to work next day in messy area. 3. Evaluate on third day the need for clean-up and relate to shop production and environment. 4. Organize schedule of duties and responsibilities stressing teamwork 5. Discuss and compare results of clean-up versus no clean-up and group interaction as related to clean-up.
<p><u>Skills to be Learned</u></p> <ol style="list-style-type: none"> 1. Cooperation 2. Responsibility 3. Benefits of clean-up <ol style="list-style-type: none"> A. Neater work B. Equip. in proper place. C. Better working atmosphere D. Safer place to work. 	

ms interact

their

n intricate

em.

Discipline Area Industrial Arts

Subject Metals

Problem Orientation Clean-up Grade 7-12

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

1. Let clean-up go for one day.
2. Allow students to work next day in messy area.
3. Evaluate on third day the need for clean-up and relate to shop production and environment.
4. Organize schedule of duties and responsibilities stressing teamwork
5. Discuss and compare results of clean-up versus no clean-up and group interaction as related to clean-up.

II. Outside Resource and Community Activities

1. Field trip to local manufacturing area to view practical applications and advantages of neatness and cleanliness.
2. Presentation by industrial commission representative on safety & production as related to neatness & teamwork.

Resource and Reference Materials	Continued and Additional
<u>Publications:</u> <u>Metalwork Technology and Practice</u> Ludwig & McCarthy McKnight & McInight <u>Forging & Welding,</u> Robert E. Smith McKnight & McInight <u>Metalworking,</u> T. Gardner Boyds	1. Develop methods of responsibility mon 2. Develop list of pl clean-up effort wo
<u>Audio-Visual:</u> <u>Industrial Arts: A Safe Shop,</u> University of Ill.	
<u>Community:</u> Safety inspector industrial commission.	

onated and Additional Suggested Learning Experiences

Develop methods of making clean-up
responsibility more efficient.
Develop list of places where a team
clean-up effort would be beneficial.

C O N C E P T

3. Environmental factors are limiting on the numbers of organisms Dis living within their influence, Sub thus, each environment has a Pro carrying capacity.

BEHAVIORAL OBJECTIVES

Cognitive: The student will list and explain 3 physical and 3 psychological effects of environmental crowding and relate them to specific areas.
Affective: The student will realize that crowding results in adverse physical & psychological conditions.

Skills to be Learned
Hazards in environmental crowding.

- I. Student-Cent activity
1. Conduct e around fo condition
 - A. Develop ie. sa layout holes
 - B. Provide each o
 - C. Limit one tal
 - D. Limit
 - E. Mass pe allowed
 - F. First win
 2. Discuss pe feelings c experiment
 - A. Low pro
 - B. Confusi
 - C. Frustra
 - D. Irritab
 - E. Waste
- (Con't)

ESAY Title III -59-70-0135-3 Project I-C-E

are

Dis organisms Discipline Area Industrial Arts
Sub nce, Subject Metals
Pro a Problem Orientation Crowding in Shop Grade 7-12

SUGGESTED LEARNING EXPERIENCES

Student-Centered in class activity

1. Conduct experiment around following conditions:
 - A. Develop simple task
ie. saw off stock
layout & drill 4
holes
 - B. Provide only one
each of tools required
 - C. Limit work area to
one table
 - D. Limit time
 - E. Mass production not
allowed
 - F. First three finished
win
 2. Discuss personal & physical
feelings experienced during
experiment.
 - A. Low production
 - B. Confusion
 - C. Frustration
 - D. Irritability
 - E. Waste
- (Con't)

II. Outside Resource and
Community Activities

1. Psychologist
2. Community planning
committee
3. Real estate developer

ges and Additional Suggested Learning Experiences

n I.)
ene pens if this happened in town?

s t crowding
xperienced results to concept #3.

C O N C E P T

4. An adequate supply of
pure water is essential for life.

Discipline Area Industrial

Subject Metals

Problem Orientation Pure Water
Manufacturing

E-I	BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
ESPA Title III -59-70-0135-2 Project I-C-1	<p><u>Cognitive:</u> The student will be able to list 5 methods in which waste water is treated in the metals industry.</p> <p><u>Affective:</u> The student will understand how waste water in metal manufacturing is processed to purify it to standards.</p>	<p>II. Student-Centered in class activity</p> <p>A Field trip to gain knowledge of water use in manufacturing.</p> <p>B Group discussion</p> <ol style="list-style-type: none"> How water used in the manufacture & processing of metals? Is the water "pure" when you are finished with it? (Yes) What is being done to accomplish this? (No) What can be done to accomplish this? Is water recycled thru the process or only used once---why? Is water sent thru local sewage treatment plant? Why-Why not?
	<p><u>Skills to be Learned</u></p> <ol style="list-style-type: none"> How water is used in manufacturing How waste water quality is maintained Water quality standards 	<p>II. Out of class activity</p> <p>A. Co-learn</p> <p>B. Co-learn</p> <p>C. Co-learn</p> <p>D. Co-learn</p>

Discipline Area Industrial Arts

Subject Metals

Problem Orientation Pure Water & Manufacturing Grade 7-12

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class

- Activity
- A. Field trip to gain knowledge of water use in manufacturing.
Group discussion
How water used in the manufacture & processing of metals?
Is the water "pure" when you are finished with it?
(Yes) What is being done to accomplish this?
- C. (No) What can be done to accomplish this?
Is water recycled thru the process or only used once---why?
Is water sent thru local sewage treatment plant? Why-Why not?

II. Outside Resource and Community Activities

- A. Visit local plants & see how water is used in processing and/or manufacturing of metal.
- B. Visit local sewage treatment plant & have engineer explain problems related to treatment of industrial waste.
- C. D.M.R. representative
- D. Chemistry inst.

Resource and Reference Materials

Publications:

Forging and Welding,
Robert E. Smith
McKnight & McKnight.
Metalwork: Technology & Practice,
Oswald A. Ludwig
McKnight & McKnight

Audio Visual:

Community:

1. D.P.R.
2. Local sewage engineer.
3. Local manufacturer
large quantities of water.

Continued and Additional Suggested Learning

1. Students will write and report on water treatment process. Be prepared to explain effects of water moving different soils testing the results.
2. Set up a model sediment pond using contrasting soils ie. sand, gravel, Test the purity of the water before piercing thru soil.

earn d Additional Suggested Learning Experiences
n wa will write and report on water
o ex t process. Be prepared to explain
t so of water moving different soils &
the results.
ng t model sediment pond using three
el, ing soils ie. sand, gravel, & clay.
ore purity of the water before & after
thru soil.

C 5. An adequate supply of clean air
 O
 N is essential because most organisms Discipline Area Industrial
 C
 E depend on oxygen, through respiration, Subject Metals
 P
 T to release the energy in their Problem Orientation Dealing
 food. Welding Fu

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
<p>Cognitive: The student will express in writing the toxic effects of the fumes produced in welding.</p> <p>Affective: The student will turn on the exhaust system before welding, realize what ideal conditions are desired, use conservatively.</p>	<p>I. Student-Centered in class activity</p> <p>A. Demonstrate various welding techniques & observe visible fumes produced.</p> <p>B. Discuss where these fumes come from, & what their effect is on an individual. (Guest speaker if desired)</p> <p>C. Have member of industrial commission explain how such fumes are dealt with in industry.</p> <p>D. Discuss & brainstorm how fumes can be dealt with in the school shop area.</p>
<p><u>Skills to be Learned</u></p> <p>1. Effects of welding fumes on an individual.</p> <p>2. How toxic fumes are handled in industry.</p> <p>3. How toxic fumes are & can be handled in the shop.</p>	<p>II. Out of class activity</p> <p>A. Observe visible fumes produced.</p> <p>B. Discuss where these fumes come from, & what their effect is on an individual. (Guest speaker if desired)</p> <p>C. Have member of industrial commission explain how such fumes are dealt with in industry.</p> <p>D. Discuss & brainstorm how fumes can be dealt with in the school shop area.</p>

ESSE Title III -59-70-0135-2 Project I-C-E

of clean air

Discipline Area Industrial Arts

Subject Metals

Problem Orientation Dealing With ToxicGrade 9-12
Welding Fumes

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

- A. Demonstrate various welding techniques & observe visible fumes produced.
- B. Discuss where these fumes come from, & what their effect is on an individual. (Guest speaker if desired)
- C. Have member of industrial commission explain how such fumes are dealt with in industry.
- D. Discuss & brainstorm how fumes can be dealt with in the school shop area.

II. Outside Resource and Community Activities

- A. Industrial Commission representative.
- B. School chemistry teacher.
- C. Local welding or metal fabricating person.

Resource and Reference Materials	Continued and Additional Sug
<u>Publications:</u> <u>Forging and Welding, Robert E. Smith, McKnight & McKnight</u> <u>Oxyacetylene Welding and Cutting, Stuart & Plumley</u> <u>McGraw Hill</u>	
<u>Audio-Visual:</u> <u>Oxyacetylene Welding:</u> <u>Safety and Operations</u> <u>#53445 University of Ill.</u>	
<u>Community:</u> <u>Industrial Commission Rep.</u> <u>School chemistry teacher</u> <u>Local welder</u> <u>Local welding supplier</u>	

Continued and Additional Suggested Learning Experiences

C O N C E P T	6. Natural resources are not	
	equally distributed over the earth	Discipline Area Indu
	or over time and greatly affect	Subject Metal
	the geographic conditions and quality of life.	Problem Orientation S

ESEA Title III -59--70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING
<p>Cognitive: The students will be able to identify 5 adverse conditions created by strip mining.</p> <p>Affective: Students will become aware of how strip mining affects geographic conditions.</p> <p><u>Skills to be Learned</u></p> <ol style="list-style-type: none"> 1. Ecological management of strip mining. 2. Methods of mining raw ore & its effect on our environment. 	<p>I. Student-Centered in class activity</p> <p>A. Research the following aspects of strip mining</p> <ol style="list-style-type: none"> 1. Site selection 2. Site development 3. Community involvement 4. Side effects <ol style="list-style-type: none"> a. Physical b. Social c. Mental <p>B. Field trip and/or movie/ film strip/slides to experience how strip mines are being "Re-cycled" for better land use.</p> <p>C. Discuss effects of mining in relationship to community.</p> <ol style="list-style-type: none"> 1. How these materials help us? 2. How present mining techniques destroy natural environment. 3. Possible alternatives and/or improved processes

ces are not
 Indu & over the earth Discipline Area Industrial Arts
 Metal greatly affect Subject Metals
 on S itions and Problem Orientation Strip mining & its effects Grade 7-12

IVES	SUGGESTED LEARNING EXPERIENCES	
ts will	I. Student-Centered in class activity	II. Outside Resource and Community Activities
ated	A. Research the following aspects of strip mining	A. Field trip to open pit and/or strip mine to see mining operations and to question about land reclamation.
il	1. Site selection	B. Library research
rip	2. Site development	C. D.H.R.
hic	3. Community involvement	
	4. Side effects	
	a. Physical	
	b. Social	
nt	c. Mental.	
	B. Field trip and/or movie/ film strip/slides to experience how strip mines are being "Re-cycled" for better land use.	
leed"	C. Discuss effects of mining in relationship to community.	
ng	1. How these materials help us?	
un-	2. How present mining techniques destroy natural environment.	
	3. Possible alternatives and/or improved processes.	
s		
esse		

Resource and Reference Materials

Publications:
Forging and Welding,
Robert E. Smith
McKnight & McKnight
Encyclopedias

Audio-Visual:

Mining for Nickel,
Rothacker Motion Picture
241 W. 17th St., New York, N. Y.
Continuous Excavating,
New Concept in Mining
More, Bigger, Deeper Blast
Hole Drills, Ideal Pictures
4431 W. North, Milwaukee, Wis.

Community:

1. D.E.R.
2. Local strip mine

Continued and Additional

1. Develop slide series and
"Good vs Bad" strip mine

Materials	Continued and Additional Suggested Learning Experiences
	1. Develop slide series and/or picture set of "Good vs Bad" strip mining.

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 ctures
 kee, Wis.

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T

7. Factors such as facilitating

transportation, economic conditions , Discipline Area I

population growth, and increased Subject

leisure time have a great influence Problem Orientation
on changes in land use and centers
of population density.

BEHAVIORAL OBJECTIVES

SUGGESTED LEARNING

ESEA Title III -59-70-0135-2 Project I-C-E

Cognitive: The student will be able to list new businesses and industries created by the do-it-yourself concept & more available leisure time.
Affective: The student will make better use of his leisure time through the use of do-it-yourself projects.

Skills to be Learned

1. Efficient use of leisure time.
2. How leisure time effects land use.

- I. Student-Centered in class activity
 - A. Students will research how the do-it-yourself & leisure activities have changed industries transportation & population centers.
 - B. Discuss how the sale of RV's have made an impact on the metals industry.
 - C. What role is industrial arts providing in basic skills for the do-it-yourself concept--specifically in metals area?

such as facilitating

economic conditions, Discipline Area Industrial Arts

growth, and increased

Subject

Metals

have a great influence
land use and centers
density.

Problem Orientation Leisure Time

Grade 7-12

Effects Land Use

OBJECTIVES

SUGGESTED LEARNING EXPERIENCES

Student

I. Student-Centered in class activity

II. Outside Resource and Community Activities

by

- A. Students will research how the do-it-yourself & leisure activities have changed industries, transportation & population centers.
- D. Discuss how the sale of RV's have made an impact on the metals industry.
- C. What role is industrial arts providing in basic skills for the do-it-yourself concept--specifically in metals area?

- A. Local building supply dealer.
- B. Local recreational vehicle dealer, ie
 - 1. Pickups
 - 2. Snowmobiles
 - 3. Minibikes
 - 4. ATV's
 - 5. Boats

Resource and Reference Materials Continued and Additional Suggeste on

Publications:

Modern Projects in Wood,
Metal and Plastic,
Patrick E. Spielman
Bruce Publishing
Do-It-Yourself Encyclopedias

Audio-Visual:

Community:
Local building supply dealer.
Local recreational vehicle
dealer.

este continued and Additional Suggested Learning Experiences

ESEA Title III 59-70-0135-2 Project I-C-E

8. Cultural, economic, social,

and political factors determine

status of man's values and attitudes

toward his environment.

Discipline Area Indus

Subject Metals

Problem Orientation The
Of

BEHAVIORAL OBJECTIVES

SUGGESTED LEARNING

Cognitive: The students
will create a flow chart
pointing out the effects
& conflicts in cultural,
economic, social, & political
areas brought about by a
metal-industry problem
Affective: The student
will realize the cultural,
economic, social, &
political interactions
brought about by a prob-
lem in the metal-working
industry.

Skills to be learned

1. Cause & effect thinking
2. Political processes
3. Economics of change

- I. Student-Centered in class activity
 - A. Discuss local or widely known pollution problem pertaining to metals industry, ie:
 1. Water pollution-
Lake Superior
 2. Noise pollution-
Foundry
 3. Air pollution -
Foundry, steel mill
 - B. Either-
 1. Have open discussion as to what effects an attempt to clear up a pollution problem has on each aspect of society, ie, Society gets excited, fires up politicians, they chase industry, try to force change. Products prices go up to meet increase, etc.
-or-
 2. Organize round table discussion between
(con't)

1,
Discipline Area Industrial Arts
Subject Metals
Problem Orientation The Ramifications Grade 10-12
Of Change

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

A. Discuss local or widely known pollution problem pertaining to metals industry, ie:

1. Water pollution--
Lake Superior
2. Noise pollution--
Foundry
3. Air pollution -
Foundry, steel mill

D. Either--

1. Have open discussion as to what effects an attempt to clear up a pollution problem has on each aspect of society, ie, Society gets excited, fires up politicians, they chase industry, try to force change. Products prices go up to meet increase, etc.

-or-

2. Organize round table discussion between
(con't)

II. Outside Resource and Community Activities

- A. Local economist.
- B. Industrial Commission representative.
- C. Local politician.
- D. Representative of local metal-fabricating industry.

Resource and Reference Materials
Publications:

Audio-Visual:
#03140- Air Pollution
University of Illinois film

Community:
Local economist.
Industrial Commission Rep.
Local politician.
Rep. from local metal working
plant.

Continued and Additional Suggest als

(Con't from I.)
industrial representative, econ
to bring out changes caused by
an industrial pollution problem

gest	als	Continued and Additional Suggested Learning Experiences
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recon by plen	(Con't from I.) industrial representative, economist, & politician to bring out changes caused by attempting to solve an industrial pollution problem.
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C O M C E P T

9. Man has the ability to
manage, manipulate, and change
his environment.

Discipline Area Industry
Subject Metals
Problem Orientation Foundry
Abatement

ESEA Title III -- 59-70-0135 -- 2 Project I-C-E

BEHAVIORAL OBJECTIVES

Cognitive: The student
will report on two
foundries that have
installed pollution
abatement equipment.
Affective: The students
will realize that foundries
produce not only castings
but also air, water &
noise pollution.

Skills to be Learned
1. Man can manage pollution
if he wants to.
2. Various forms of pollu-
tion affect human
behavior.
3. What pollutants are
produced by foundries.

SUGGESTED LEARNING EXPERIENCES

- I. Student-Centered in class activity
- View movie Iron Product of the Blast Furnace.
 - Class discussion:
 - What pollutants are produced by a foundry?
 - Air
 - Water
 - Noise
 - Thermal
 - Are the pollutants an environmental hazard? How? What is being done? What can be done?
 - Relate the results of the discussion back to concept #9.

II.

change
Discipline Area Industrial Arts
Subject Metals
Problem Orientation Foundry Pollution Grade 7-12
Abatement

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

- A. View movie Iron Product of the Blast Furnace.
- B. Class discussion:
 - 1. What pollutants are produced by a foundry?
 - A. Air
 - B. Water
 - C. Noise
 - D. Thermal
 - 2. Are the pollutants an environmental hazard? How? What is being done? What can be done?
- C. Relate the results of the discussion back to concept #9.

II. Outside Resource and Community Activities

- A. Environmental engineer from foundry.
- B. D.W.R.
- C. Local industry rep. in whose company pollution abatement equipment has been installed.

Resource and Reference Materials Continued and Additional Suggest

Publications:

Exploring Patternmaking and Foundry

Miner & Miller

D. VanNostrand Company

1. Develop a collection of local articles which discuss local related pollution problems chronologically sequence can

Audio-Visual:

#80067 Noise & Health

University of Ill.

#1100 Iron: Product of the

Blast Furnace BAVI

Community:

1. Environmental engineers
2. D.N.R.
3. Local industry rep.

Materials	Continued and Additional Suggested Learning Experiences
<p>gges f lo loc and Foundry lems can</p>	<p>1. Develop a collection of local newspaper articles which discuss local industry related pollution problems so that a chronological sequence can be followed.</p>

the

eers

C 10. Short-term economic gains

O- may produce long-term

N- environmental losses.

C
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P
T

Discipline Area Indus

Subject Metals

Problem Orientation M

ESEA Title III - 59-70-0135-2 Project I-C-E

BEHAVIOFAL OBJECTIVES

Cognitive: The student will be able to list, the way man's early mining is now costing us money to reclaim the land.

Affective: As an adult, the student will be a concerned citizen about land use, and mining operations.

Skills to be Learned

Land reclamation

SUGGESTED LEARNING

I. Student-Centered in class activity

1. Students will view film on ore open pit mining.
2. Students will view slides of old abandoned open pit mines to view how the area is a total waste land.
3. Students will develop plans that could have been used to reclaim the area as it was mined.
4. Students will develop plans that could be used to relaim these areas today.

ort-term economic gains

duce long-term

mental losses.

Discipline Area Industrial Arts

Subject Metals

Problem Orientation Mining Waste Grade 7-12

GENERAL OBJECTIVES

The student
be able to list, the
early mining
ing us money
the land.
As an adult,
will be a
citizen about
and mining

What is Learned
Information

SUGGESTED LEARNING EXPERIENCES

I. Student-Centered in class activity

1. Students will view film on ore open pit mining.
2. Students will view slides of old abandoned open pit mines to view how the area is a total waste land.
3. Students will develop plans that could have been used to reclaim the area as it was mined.
4. Students will develop plans that could be used to reclaim these areas today.

II. Outside Resource and Community Activities
Mining companies.
Land developers.

Resource and Reference Materials	Continued and Additional Suggested Learning Materials
<p><u>Publications:</u> <u>Encyclopedias</u> <u>Forging and Welding,</u> <u>Robert E. Smith</u> <u>McKnight & McKnight</u></p> <p><u>Audio-Visual:</u> <u>#51311 Copper Mining</u> <u>University of Ill.</u> <u>#1198 Iron Ore Mining BAVI</u></p> <p><u>Community:</u> <u>Land developer</u></p>	

Learning Materials	Continued and Additional Suggested Learning Experiences
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VI

C 11. Individual acts, duplicated
 O or compounded, produce significant
 N environmental alterations over
 E time.
 P
 T

Discipline Area Industrial
 Subject Metals
 Problem Orientation Alleviate Waste

ESEA Title III - 59-70-0135-2 Project I-C-E	BEHAVIORAL OBJECTIVES	SUGGESTED LEARNING EXPERIENCES
	<p><u>Cognitive: The student will list 5 places in which cumulative error will lead to waste.</u> <u>Affective: The student will become aware of a small error multiplying into a large waste.</u></p>	<p>I. Student-Centered in class activity A. Basically a general discussion using examples: 1. Three classes cutting stock from large piece; if each person cuts his 1/16" long, a full piece or more is wasted before work is started. 2. One person welding without system to exhaust fumes; result is negligible. Many persons welding without exhaust system could be fatal.</p>
	<p><u>Skills to be Learned</u> 1. Accuracy in measurement 2. Economics 3. Multiplication of error</p>	<p>II. Out of class activity A. Discuss the importance of safety in the workplace. B. Relate "one instance not too bad, but many instances can be dreadful" Theory to environmental problems, ie: 1. Exhaust emission 2. Water pollution 3. Environmental deterioration</p>

ts, duplicated

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Discipline Area Industrial Arts

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Subject Metals

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Problem Orientation Alleviations of Grade 7-12
Waste

EXPERIENCES	SUGGESTED LEARNING EXPERIENCES		
<p>. Ou Ac A. B. C.</p> <p>ement error</p>	<table><tr><td><p>I. Student-Centered in class activity</p><p>A. Basically a general discussion using examples:</p><ol style="list-style-type: none">1. Three classes cutting stock from large piece; if each person cuts his 1/16" long, a full piece or more is wasted before work is started.2. One person welding without system to exhaust fumes, result is negligible. Many persons welding without exhaust system could be fatal.<p>B. Relate "one instance not too bad, but many instances can be dreadful." Theory to environmental problems, ie:</p><ol style="list-style-type: none">1. Exhaust emission2. Water pollution3. Environmental deterioration</td><td><p>II. Outside Resource and Activities</p><ol style="list-style-type: none">A. Quality control personnelB. Purchasing agentC. Salvage engineer</td></tr></table>	<p>I. Student-Centered in class activity</p> <p>A. Basically a general discussion using examples:</p> <ol style="list-style-type: none">1. Three classes cutting stock from large piece; if each person cuts his 1/16" long, a full piece or more is wasted before work is started.2. One person welding without system to exhaust fumes, result is negligible. Many persons welding without exhaust system could be fatal. <p>B. Relate "one instance not too bad, but many instances can be dreadful." Theory to environmental problems, ie:</p> <ol style="list-style-type: none">1. Exhaust emission2. Water pollution3. Environmental deterioration	<p>II. Outside Resource and Activities</p> <ol style="list-style-type: none">A. Quality control personnelB. Purchasing agentC. Salvage engineer
<p>I. Student-Centered in class activity</p> <p>A. Basically a general discussion using examples:</p> <ol style="list-style-type: none">1. Three classes cutting stock from large piece; if each person cuts his 1/16" long, a full piece or more is wasted before work is started.2. One person welding without system to exhaust fumes, result is negligible. Many persons welding without exhaust system could be fatal. <p>B. Relate "one instance not too bad, but many instances can be dreadful." Theory to environmental problems, ie:</p> <ol style="list-style-type: none">1. Exhaust emission2. Water pollution3. Environmental deterioration	<p>II. Outside Resource and Activities</p> <ol style="list-style-type: none">A. Quality control personnelB. Purchasing agentC. Salvage engineer		

Resource and Reference Materials	Continued and Additional Suggested Learning
<p data-bbox="338 920 582 948"><u>Publications:</u></p> <p data-bbox="338 948 957 982"><u>Metalwork Technology and Practice</u></p> <p data-bbox="338 982 674 1012">Ludwig & McCarthy,</p> <p data-bbox="338 1012 696 1044">McKnight & McKnight</p> <p data-bbox="338 1044 654 1076"><u>Technical Metals,</u></p> <p data-bbox="338 1076 658 1108">Harold V. Johnson</p> <p data-bbox="338 1108 708 1143">Chas. A. Bennett Co.</p> <p data-bbox="338 1212 578 1242"><u>Audio-Visual:</u></p> <p data-bbox="338 1242 938 1345">Home-made slide series of photo series showing areas or examples of great waste.</p> <p data-bbox="338 1510 525 1540"><u>Community:</u></p> <ol data-bbox="338 1540 801 1643" style="list-style-type: none"> 1. Quality control person 2. Purchasing agent 3. Salvage engineer 	<ol data-bbox="1005 920 1810 1150" style="list-style-type: none"> 1. Have students develop easy reference list or bulletin board stating where small wastes should be avoided. 2. Set up "point system" and see what members of class can find most instances of waste in <ol data-bbox="1062 1081 1397 1150" style="list-style-type: none"> 1. School 2. Local community

Continued and Additional Suggested Learning Experiences

1. Have students develop easy reference list or bulletin board stating where small wastes should be avoided.
2. Set up "point system" and see what member of class can find most instances of waste in
 1. School
 2. Local community

C 12.. Private ownership must be
 O
 N regarded as a stewardship and
 C
 E should not enroach upon or violate
 P
 T the individual right of others.

Discipline Area Indust
 Subject Metals
 Problem Orientation My
 you

ESEA Title III - 59-70-0135-2 Project I-C-E

BEHAVIORAL OBJECTIVES

Cognitive: The student
 will list 5 "wastes"
 & explain how these
 "wastes" affect others.
 Affective: The student
 will realize that all
 pollutants & waste
 violate the rights of
 others.

Skills to be Learned

1. Individual acts affect others.
2. How pollutants are controlled.

SUGGESTED LEARNING

- I. Student-Centered in class activity
 - A. Class discussion
 1. Select a few metal-working industries & develop a list of wastes produced.
 2. How do these "wastes" effect others?
 3. Is the effect desirable or undesirable?
 4. What can be done?
 5. What is being done?
 - B. Study thru class developed method, the interaction of "rights".

ship must be _____
 wardship and _____ Discipline Area Industrial Arts
 upon or violate _____ Subject Metals
 ht of others. _____ Problem Orientation My rights vs. your rights Grade 7-12

IVES	SUGGESTED LEARNING EXPERIENCES	
II.	I. Student-Centered in class activity A. Class discussion 1. Select a few metal-working industries & develop a list of wastes produced. 2. How do these "wastes" effect others? 3. Is the effect desirable or undesirable? 4. What can be done? 5. What is being done? B. Study thru class developed method, the interaction of "rights".	II. Outside Resource and Community Activities A. Public relations dept. of local manufacturing plant. B. D.N.R.
ect		

Resource and Reference Materials.

Publications:

Metalwork Technology and Practice.

Ludwig & McCarthy

McKnight & McKnight

Modern Metalworking,

John R. Walker

Hoodheart-Willcox

Audio-Visual:

Community:

1. Public relations man from local manufacturer
2. D.N.R.

Continued and Additional Suggested

1. Have students research how to handle "encroachment of right

Materials Continued and Additional Suggested Learning Experiences

- Practice.
1. Have students research how local manufacturers handle "encroachment of rights"

PROJECT I-C-E Episode Evaluation Form (Reproduce)

Please fill in:

Subject: _____

Grade: _____

Concept No. Used: _____

In commenting on each episode form. Feel free to adapt it and your critiques and comments - negative hand column, please rate (poor, good) make specific comments or suggestions provided to help us make this a more

Poor	Good	Exc.	
			I. Behavioral Objectives A. Cognitive:
			P. Affective:
			II. Skills Developed
			III. Suggested Learning Experiences A. In Class:
			B. Outside & Community Activities:
			IV. Suggested Resource & Reference Materials (specific suggestions & comments)

duce -C-E Episode Evaluation Form (Reproduce or duplicate as needed)

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In commenting on each episode used in your class, please use this form. Feel free to adapt it and add more pages. Let us know all your critiques and comments - negative and positive. In the left-hand column, please rate (poor, good, excellent) each item. Also, make specific comments or suggestions if possible in the space provided to help us make this a more usable guide. Thank you.

Behavioral Objectives
A. Cognitive:

B. Affective:

Skills Developed

Suggested Learning Experiences
A. In Class:

B. Outside & Community Activities:

Is Suggested Resource & Reference Materials
(specific suggestions & comments)

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